SMFL Services and Capabilities

The capabilities of the SMFL include:

- Wafer cleaning, ion implantation and diffusion, and high temperature processing both with conventional tube furnaces and RTP systems.
- CVD / PECVD deposition capabilities are available for oxides, nitrides, and polysilicon. A variety of vacuum systems are available for sputtering and thermal evaporation of metals and dielectrics.
- Lithography, including automated coating and development systems combined with a set of two 5:1 steppers with capabilities down to 0.40 microns, as well as 1:1 contact lithography and an electron beam exposure system for photo mask production.
- Plasma etch capabilities for silicon, oxides, nitrides, and metals and provision for a broad variety of wet chemical etch processes as well as copper electroplating and CMP.
- Complete prototyping of devices and systems with help from the electrical and surface analytical characterization labs, microelectronics layout and computer simulation facilities, and in-house industry-standard electronics packaging capability.

The SMFL offers a wide range of services from single process up to foundry services. It is by no means a complete list, please contact us so that we can discuss your needs.

Foundry Services
The SMFL has a 2um CMOS process with an effective L of 1.5um.

- We have run this process for customers using their design and incorporating our test structure for test verification.
- Aluminum and Tungsten gate metals have been processed - others are possible.
- Our Vt's are well matched but implant splits are possible.
- Typical run time is ~8 weeks
Single Process Services

Metrology

**Scanning Electron Microscopy**
There are several SEMs available for imaging a variety of samples.

- **Amray 1830 LaB6 system**
- **LEO EVO 50 LaB6 system.** Contact Sean Rommel of RIT’s Electrical and Microelectronic engineering Department about this tool.

**Film Thickness - Ellipsometry**

- **Woollam VASE** with Autoretarder operating at wavelengths from 240-1700nm and variable angle of incidence.
- **Rudolph Auto EL IV** operating at three wavelengths

**Film Thickness - Profilometry**

- **Tencor P2** is a long length scanning profilometer useful for measuring step heights.

**Film Thickness - Optical**

- **Prometrix SpectraMap SM300** and two **Nanometrics Spectrophotometers** that provide noncontact optical film thickness measurement mapping - Resist, oxide, nitride.

**Resistivity Measurements**

- **CDE Res Map** provides sheet resistance and resistivity mapping of silicon wafers and films.

Thin Film Deposition

**Sputter Deposition**

- The SMDL has a variety of DC and RF deposition tools. The **PE 4410** is loadlocked and has sputter etch capability.
- A wide variety of targets exist in bonded 8” form and unbonded 4” targets for the sputter head on the **CVC 601 Sputter**.
  - **Al/Si, Ti, Cr, W/Ti, Cu, Mo, Ta - 8” bonded, water cooled targets**
  - **Cu, Ti, Ni, Cr, Ge, InSn, Mo, NiCr - 4” target for sputter head**

**Thermal Evaporation**

- The SMFL has **two thermal evaporators** - one is a basket style for various metals and the other is a flash evaporator for deposition of aluminum.

**Electron Beam Evaporation**
The SMFL has a **CHA Ebeam Evaporator** with a 3KV electron beam gun with an eight pocket carousel.

**Plasma Enhanced Chemical Vapor Deposition (PECVD)**
The SMFL has an Applied Materials P5000 systems equipped with two deposition chambers

- **TEOS Oxide** from a few nanometers to many microns can be deposited
- **PECVD nitride and amorphous silicon** can also be deposited.
Low Pressure Chemical Vapor (LPCVD)

- Our ASM LPCVD system is capable of depositing Nitride, Poly and Low Temp Oxide.
- We also have a Parylene deposition system

Short Courses

The SMFL has run hands on courses in Cleanroom Etiquette, MEMS Processing, and Thin Films.

We can custom tailor a course to suit the needs of your organization. Please contact us and we can discuss your requirements.

A complete listing of all of the Tools in the SMFL can be found here